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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/645,879	08/22/2003	Mikio Yamazaki	1639.1035	8668

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EXAMINER

NOTE, JANIS L

ART UNIT	PAPER NUMBER
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1756

DATE MAILED: 08/24/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/645,879	Applicant(s) YAMAZAKI, MIKIO	
	Examiner Janis L. Dote	Art Unit 1756	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 20 January 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-8 and 10 is/are rejected.
- 7) ☒ Claim(s) 9 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>08/22/03</u> . | 6) <input type="checkbox"/> Other: _____  |

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1. The disclosure is objected to because of the following informalities:

(1) The misspellings "melamin" in paragraph 0030.

(2) The use of trademarks, e.g., Araldite [sic: ARALDITE] in paragraph 0077 has been noted in this application. The trademarks should be capitalized wherever they appear and be accompanied by the generic terminology. This example is not exhaustive. Applicant should review the entire specification for compliance.

Although the use of trademarks is permissible in patent applications, the proprietary nature of the marks should be respected and every effort made to prevent their use in any manner which might adversely affect their validity as trademarks.

Appropriate correction is required.

2. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required:

In claim 8, the recitation "benzene ring having a substituent that is selected from the group consisting of . . . an alkyl group" lacks antecedent basis in the specification.

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See paragraph 0031, of the specification, which discloses that the benzene ring may be substituted with a substituted alkyl group. The term "alkyl group" is outside the scope of the term "substituted alkyl group."

3. The recitation "overlapping range in molecular weight distributions" in claim 3 is defined in the instant specification in paragraphs 0037-0040, when the conditions (1) or (2), as described in paragraphs 0039 and 0040, respectively, are satisfied.

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 3 and 4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 3 is indefinite in the phrase "a mixture of two or more types of the poly(vinyl acetal) that have different weight average molecular weights . . . ." (emphasis added) because it is

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not clear what is the scope of the term "types." It is not clear whether the term "types" refers here to poly(vinyl acetal) resins having different weight average molecular weights or to resins having different weight average molecular weights that have some property or characteristic of the poly(vinyl acetal) recited in instant claim 2.

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1, 2, and 5-7 are rejected under 35 U.S.C. 102(b) as being unpatentable over Japanese Patent 2002-107972 (JP'972) combined with US 4,518,669 (Yashiki), as evidenced by applicant's admission that melamine is a thermosetting resin and that titanium oxide can be used as the fine particles that perform the functions of scattering exposed light and transporting photo-generated charges to the substrate disclosed in paragraph 0030 of the instant specification. See the

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Japanese Patent Office (JPO) machine-assisted English language translation of JP'972 for cites.

JP'972 discloses an organic electrophotographic photoconductor comprising an aluminum conductive substrate having thereon in order, an intermediate layer, a charge generation layer, and a charge transport layer. See the JPO translation, example 1 in paragraphs 0056-0062 and in Table 1. The intermediate layer comprises tin oxide coated titanium oxide particles dispersed in a binder resin. JPO translation, paragraph 0056. The charge generation layer comprises a hydroxygallium phthalocyanine as the charge generation material and a poly(vinyl butyral) resin which has a weight average molecular weight ( $M_w$ ) of  $3.0 \times 10^5$  and a number average molecular weight ( $M_n$ ) of  $5.4 \times 10^4$ . Thus, the ratio of  $M_w/M_n$  is 5.56. See the JPO translation, paragraph 0058 and Table 1. The weight average molecular weight is determined by gel permeation chromatography using polystyrene as the standard. See the JPO translation, paragraph 0035. The poly(vinyl butyral) resin is represented by the chemical structure disclosed in paragraph 0015 of the translation. The hydroxygallium phthalocyanine meets the charge generation material limitation recited in instant claim 7. The poly(vinyl butyral) disclosed by JP'972 is within the binder resin

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compositional limitation recited in instant claim 2. The Mw and the ratio of Mw/Mn are within the Mw and the ratio Mw/Mn ranges recited in instant claim 1.

JP'972 does not disclose that its intermediate layer comprises a thermosetting resin as recited in the instant claims.

Yashiki discloses an intermediate layer located between an aluminum conductive substrate and a charge generation layer. The intermediate layer comprises tin oxide treated titanium oxide particles and titanium oxide particles dispersed in a binder resin comprising an acrylic resin and a melamine resin. See example 1, col. 9, lines 25-39. The instant specification in paragraph 0030 discloses that the thermosetting resin includes melamine. Thus, the intermediate layer disclosed by Yashiki meets the undercoating layer compositional limitation recited in instant claim 1. According to Yashiki, the intermediate layer eliminates the defects associated with course faced substrates. Col. 2, lines 30-33. A photoconductor comprising the intermediate layer disclosed by Yashiki is said to provide good quality reproduced images. Col. 2, lines 41-43.

Yashiki does not disclose that tin oxide treated titanium oxide particles and titanium oxide particles "perform functions of scattering exposure light and transporting photo-generated

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charges to the substrate," as recited in instant claims 5 and 6. However, Yashiki discloses that its intermediate layer "has a nature" to scatter a light beam at its surface and can prevent the reflection of a laser beam from the substrate surface and hence the interference of the reflected laser beam. Col. 4, lines 62-68. The instant specification in paragraph 0030 also discloses that the titanium oxide particles can be used as the fine particles that perform functions of scattering exposure light and transporting photo-generated charges to the substrate. Thus, it is reasonable to presume that the tin oxide treated titanium oxide particles and titanium oxide particles disclosed by Yashiki perform the functions recited in instant claims 5 and 6. The burden is on applicant to prove otherwise. In re Fitzgerald, 205 USPQ 594 (CCPA 1980).

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of Yashiki, to use Yashiki's intermediate layer as the intermediate layer in the photoconductor disclosed by JP'972, because that person would have had a reasonable expectation of successfully obtaining an electrophotographic photoconductor that provides good quality reproduced images as disclosed by Yashiki.



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8. Claims 1, 5, 7, and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 5,066,557 (Robinette) combined with US 5,677,096 (Suzuki), as evidenced by applicant's admission that titanium oxide can be used as the fine particles that perform the functions of scattering exposed light and transporting photo-generated charges to the substrate disclosed in paragraph 0030 of the instant specification.

Robinette discloses an electrophotographic photoconductor comprising a conductive substrate having thereon in order a charge generation layer and a charge transport layer. The charge generation layer comprises vanadyl phthalocyanine and trigonal selenium as the charge generation material and the binder resin, "styrene-butadiene dimethylamino ethylmethyl acrylate" resin. See cols. 11-12, example 1. The vanadyl phthalocyanine meets the charge generation material limitation recited in instant claims 7 and 10. According to Robinette, a photoconductor comprising said charge generation layer comprising the styrene-butadiene binder resin and combination of the trigonal selenium and the phthalocyanine has improved resistance to delamination, improved adhesion of the charge generation layer to the other layers, and exhibits uniform electrical properties. Col. 3, lines 39-46 and 58-61.

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Robinette does not disclose that the exemplified styrene-butadiene copolymer has the weight average molecular weight (Mw) or the ratio of the weight average molecular weight (Mw) to the number average molecular weight (Mn) as recited in the instant claims. However, Robinette discloses that the styrene-butadiene copolymer preferably has a weight average molecular weight of about 50,000 to about 200,000 and a Mw/Mn ratio between about 3 to about 8. Col. 6, lines 58-62. The upper limits, "about 200,000" and "about 8," are within the ranges of a Mw of at "least  $7.0 \times 10^4$ " and of a ratio of Mw/Mn of at "least 4" recited in instant claim 1.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of Robinette, to use a styrene-butadiene copolymer having a Mw and a Mw/Mn ratio that are within the ranges recited in the instant claims as the styrene-butadiene copolymer binder resin in the photoconductor disclosed by Robinette, because that person would have had a reasonable expectation of successfully obtaining an electrophotographic photoconductor having the benefits disclosed by Robinette.

Robinette does not exemplify a photoconductor comprising an undercoat layer as recited in the instant claims. However, Robinette teaches that any suitable charge blocking layer may be

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interposed between the conductive layer and the charge generation layer. Col. 5, lines 12-14.

Suzuki discloses an intermediate layer that is located between the conductive substrate and a charge generation layer. The intermediate layer comprises a thermosetting melamine resin and titanium dioxide particles. Col. 5, lines 14-49, and example 1 at col. 55, lines 5-15. The intermediate layer disclosed by Suzuki meets the undercoat layer compositional limitation recited in instant claim 1. According to Suzuki, the intermediate layer has an "excellent property of blocking the hole injection." Col. 6, lines 30-31. A photoconductor comprising said intermediate layer has electrostatic characteristics resulting in improved durability. Col. 6, lines 37-46. When the melamine resin in the intermediate layer comprising the titanium oxide particles and melamine resin is hardened, the intermediate layer cannot be dissolved by the solvents used in forming the charge generation and charge transport layers, thus preventing possible damage to the intermediate layer. Col. 5, lines 33-38. The melamine resin also has excellent solubility for titanium dioxide particles, thus resulting in satisfactory coating without minute protrusions or voids. Col. 5, lines 38-42.

Suzuki does not disclose that titanium dioxide particles

"perform functions of scattering exposure light and transporting photo-generated charges to the substrate," as recited in instant claim 5. However, Suzuki discloses that the titanium dioxide particles preferably may have a "large refractive index, effectively preventing the appearance of moiré patterns during image writing by means of coherent light beams from laser beams." Col. 5, lines 18-21. The instant specification in paragraph 0030 also discloses that the titanium oxide particles can be used as the fine particles that perform functions of scattering exposure light and transporting photo-generated charges to the substrate. Thus, it is reasonable to presume that the titanium dioxide particles disclosed by Suzuki perform the functions recited in instant claim 5. The burden is on applicant to prove otherwise. Fitzgerald, supra.

9. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Robinette combined with Suzuki, as evidenced by applicant's admission that titanium oxide can be used as the fine particles that perform the functions of scattering exposed light and transporting photo-generated charges to the substrate disclosed in paragraph 0030 of the instant specification, as applied to claim 7 above, further combined with US 5,759,726 (Tambo).

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Robinette combined with Suzuki renders obvious an electrophotographic photoconductor as described in paragraph 8 above, which is incorporated herein by reference.

Robinette does not exemplify a photoconductor comprising the phthalocyanine recited in instant claim 8. However, Robinette discloses that the phthalocyanine used in its charge generation layer may include metal phthalocyanine particles and metal-free phthalocyanine particles. Col. 6, lines 62-65.

Tambo teaches a chlorogallium phthalocyanine comprising benzene rings substituted with chlorine, which is within the phthalocyanine compositional limitation recited in instant claim 8. See col. 3, lines 11-32, and cols. 13-14, synthesis example 1. According to Tambo, the incorporation of said chloro-substituted chlorogallium phthalocyanine in photosensitive layers, such as a charge generation layer, leads to a high-level electron-transporting function of the photosensitive layer, stability in repeated use, and maintenance of an excellent image free of reduction in density of image or tinting of background for a long period of time. Col. 2, line 59, to col. 3, line 8; col., 8, lines 36-42; example 7 at cols. 15-16, and Table 1, example 7.

It would have been obvious for a person having ordinary skill in the art, in view of the teachings of Robinette and

Tambo, to use Tambo's chloro-substituted chlorogallium phthalocyanine as the phthalocyanine compound in the photoconductor rendered obvious over the combined teachings of Robinette and Suzuki, because that person would have had a reasonable expectation of successfully obtaining an electrophotographic photoconductor having the benefits disclosed by Robinette and Tambo.

10. Claim 9 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 3 and 4 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

The prior art of record does not disclose or teach a charge generation layer comprising the combination of two or more "types" of poly (vinyl acetal) that have different weight average molecular weights and an overlapping range in molecular weight distributions as recited in instant claims 3 and 4. As discussed in paragraph 7 above, JP'972 teaches a charge generation layer comprising a charge generating hydroxygallium

phthalocyanine and a poly(vinyl butyral) binder resin that meets the binder resin limitations recited in instant claims 1 and 2. However, JP'972 does not teach that the poly(vinyl butyral) binder resin comprises two resins having different weight average molecular weights and overlapping molecular weight distributions as recited in instant claims 3 and 4.

The prior art of record does not teach or suggest that "the charge generation material is an amorphous titanyl-phthalocyanine" as recited in instant claim 9. As discussed in paragraph 7 above, JP'972 teaches that its charge generation material is a hydroxygallium phthalocyanine. As discussed in paragraph 8 above, Robinette teaches that its charge generation material is a combination of trigonal selenium and a phthalocyanine. The charge generation material disclosed in either JP'972 and Robinette are outside the scope of the charge generation material recited in instant claim 9.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Janis L. Dote whose telephone number is (571) 272-1382. The examiner can normally be reached Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Mark Huff, can be reached on (571) 272-1385. The central fax phone number is (703) 872-9306.

Any inquiry of papers not received regarding this communication or earlier communications should be directed to

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Supervisory Application Examiner Ms. Claudia Sullivan, whose telephone number is (571) 272-1052.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JLD  
Aug. 20, 2004

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GROUP 1700  
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